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09/931,643	08/15/2001	Bruce A. Schofield	13071BAUS02U	2705

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EXAMINER	
LEUNG, CHRISTINA Y	

ART UNIT	PAPER NUMBER
2633	13

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/931,643	SCHOFIELD ET AL.	
	Examiner	Art Unit	
	Christina Y. Leung	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5, 7-11, 13-22, 24-28, and 30-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Kirby (US 6,647,208 B1).

Regarding claims 1 and 18, Kirby discloses a network device (Figure 2A) comprising:

optical switching logic (including demultiplexers 225, multiplexers 260, and optical switch 205) coupled between a plurality of input optical interfaces (the connections to fibers 215) and a plurality of output optical interfaces (the connections to fibers 265), for forwarding an optical data stream to one of the optical interfaces for output on at least one optical fiber (column 5, lines 6, lines 54-60); and

routing logic (including electronic switch 200, shown in detail in Figure 2B, which includes optical switch control processor 285) operably coupled to the switching logic to selectively receive the optical data stream from the optical switching logic (such as via one of demultiplexers 225) and retrieve routing information from the optical data stream, wherein the routing information is used to dynamically control the forwarding of the optical data stream through the optical switch logic to one of the output optical interfaces on the at least one optical fiber (column 6, lines 16-20; column 7, lines 5-62).

Further regarding claim 18 in particular, Kirby discloses a system comprising at least two network devices such as described above. Figure 1 shows several elements 110, labeled HEOS 1-5, connected together in a larger system; Kirby discloses that each of the HEOS elements 110 is a hybrid electro-optical switch as shown in Figure 2A.

Regarding claims 2 and 19, Kirby discloses that the optical switching logic is operably coupled to receive an incoming optical data stream from an incoming optical fiber 215 over an incoming optical interface and selectively pass the incoming optical data stream through to an outgoing optical fiber 265 over an outgoing optical interface (through optical switch 205, for example) or divert the incoming optical data stream (via fibers 232, using demultiplexers 225) for processing by the routing logic (column 6, lines 16-25; column 7, lines 5-8).

Regarding claims 3 and 20, Kirby discloses that the optical switching logic comprises a demultiplexer 225 operably coupled to demultiplex the incoming optical data stream from a number of incoming optical data streams received from the incoming optical fiber over the incoming optical interface.

Regarding claims 4 and 21, Kirby discloses that the optical switching logic further comprises an optical switch 205 operably coupled to receive the incoming optical data stream from the demultiplexer and to selectively pass the incoming optical data stream through to the outgoing optical fiber 265 over the outgoing optical interface or divert the incoming optical data stream for processing by the routing logic. Although the routing logic 200 may receive incoming data directly from a demultiplexer 225 via fibers 232, Kirby also discloses that the switch 205 may itself divert incoming optical data to the routing logic 200 via fibers 250 (column 8, lines 56-57).

Regarding claims 5 and 22, Kirby discloses that the optical switch 205 comprises an optical add/drop fabric. Optical switch 205 may convey some signals from the incoming fibers to the outgoing fibers without opto-electrical conversion, but Kirby also discloses that the optical switch 205 is able to drop signals via fibers 250 into the electrical domain to electronic switch/routing logic 200; Kirby further discloses that the optical switch 205 is correspondingly able to add signals from the electrical domain via fibers 245. Therefore, the optical switch 205 comprises an optical add/drop fabric.

Regarding claims 7 and 24, Kirby discloses that the optical switching logic further comprises an optical receiver (part of a line card 275 in Figure 2B) operably coupled to receive the diverted incoming optical data stream from the optical switch and convert the diverted incoming optical data stream into incoming digitally formatted information for processing by the routing logic (column 7, lines 23-25).

Regarding claims 8 and 25, Kirby discloses that routing logic 200 is operably coupled to receive the incoming digitally formatted information from the optical receiver (element 275) and route the incoming digitally formatted information based upon a routing mechanism (column 21-38).

Regarding claims 9 and 26, Kirby discloses that the routing logic is operably coupled to forward outgoing digitally formatted information to the optical switching logic for forwarding to an outgoing optical fiber over an outgoing optical interface. Regarding claims 10 and 27, Kirby discloses that the optical switch logic is operably coupled to receive the outgoing digitally formatted information from the routing logic and output an outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface. With regard to claims 9, 10, 26, and

27, Kirby discloses that digitally formatted information may be forwarded through the routing logic 200 to the optical switch logic (specifically at optical switch 205) via fibers 245 (column 8, lines 56-59) for eventual output over and outgoing optical interface. Alternatively, Kirby also discloses that the routing logic 200 is coupled to forward outgoing digitally formatted information to the optical switching logic at multiplexers 260, where the information is output onto fibers 265.

Regarding claims 11 and 28, Kirby discloses that the optical switching logic comprises an optical transmitter (part of a line card 290 in Figure 2B) operably coupled to receive the outgoing digitally formatted information from the routing logic and produce the outgoing optical data stream from the digitally formatted information at a predetermined wavelength (column 7, lines 25-29;.column 9,lines 5-7).

Regarding claims 13 and 30, Kirby discloses that the optical transmitter may comprise a tunable laser tuned to produce the outgoing optical data stream at the predetermined wavelength (column 9, lines 5-7).

Regarding claims 14 and 31, Kirby discloses that wherein the optical switching logic further comprises:

an optical switch 205 operably coupled to receive the outgoing optical data stream from the optical transmitter (Figure 2A shows how a signal can be directed from an output of routing logic 200 to an input of optical switch 205 via fibers 245); and

a multiplexer 260 operably coupled to receive the outgoing optical data stream from the optical switch and add the outgoing data stream to the outgoing optical fiber 265 over the outgoing optical interface.

Regarding claims 15 and 32, again, Kirby discloses that the optical switch 205 comprises an optical add/drop fabric. Optical switch 205 may convey some signals from the incoming fibers to the outgoing fibers without opto-electrical conversion, but Kirby also discloses that the optical switch 205 is able to drop signals via fibers 250 into the electrical domain to electronic switch/routing logic 200; Kirby further discloses that the optical switch 205 is correspondingly able to add signals from the electrical domain via fibers 245. Therefore, the optical switch 205 comprises an optical add/drop fabric.

Regarding claims 16 and 33, Kirby discloses that the optical switching logic further comprises a combiner (multiplexers 260) operably coupled to receive the outgoing optical data stream from the optical transmitter 290 (i.e., an optical signal output from routing logic 200) and add the outgoing optical data stream to the outgoing optical fiber 265 over the outgoing optical interface.

Regarding claims 17 and 34, Kirby discloses that the networking device/system is an optical switch router (Abstract).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6, 12, 23, 29, and 35-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kirby.

Regarding claims 6 and 23, Kirby discloses a system as discussed above with regard to claims 1-3 and 18-20 respectively above but does not specifically disclose that the optical switch comprises an optical drop-only fabric. However, it would have been obvious to a person of ordinary skill in the art to specifically have a drop-only fabric in the system described by Kirby simply as an engineering design choice to save costs and reduce complexity if users at that switching location in the system only wished to receive signals from the optical switch and did not require adding/transmitting them from the electrical domain.

Regarding claim 12, Kirby discloses a system as discussed above with regard to claims 1 and 9-11. Regarding claim 29, Kirby discloses a system as discussed above with regard to claims 18 and 26-28. Regarding both claims 12 and 29, Kirby discloses that the line cards 290 include optical transmitters which convert electrical signals into optical ones and further discloses that some of those transmitters may comprise tunable lasers so that some of the outputs may produce different optical output wavelengths (column 9, lines 5-7). Kirby does not specifically disclose that the other transmitters may comprise fixed wavelength lasers, but Kirby clearly already discloses that those other transmitters provide fixed, "dedicated" wavelengths, in contrast with the ones comprising tunable lasers (column 7, lines 21-29). It is well known in the art that an optical transmitter providing a dedicated wavelength as disclosed by Kirby may be implemented with a fixed wavelength laser.

It would have been obvious to a person of ordinary skill in the art to use a fixed wavelength laser, as the optical transmitter for providing an outgoing optical data stream at a predetermined wavelength that is already disclosed by Kirby, as an economical way to provide an optical transmission when the capability to transmit more than one wavelength is not required.

Regarding claim 35, Kirby discloses a device (Figure 2A) comprising:

a router interface (connections from the optical switching logic to routing logic/electronic switch 200 such as fibers 232 and 250);

optical switching logic (including demultiplexers 225, multiplexers 260, and optical switch 205) operably coupled to receive an incoming optical data stream from an incoming optical fiber 215 over an incoming optical interface and selectively pass the incoming optical data stream through to an outgoing optical fiber 265 over an outgoing optical interface or divert the incoming optical data stream over the router interface (through fibers 232 or 250) for processing by routing logic 200,

wherein the routing logic (including electronic switch 200, shown in detail in Figure 2B, which includes optical switch control processor 285) is operably coupled to the switching logic to selectively receive the optical data stream from the optical switching logic and retrieve routing information from the optical data stream, wherein the routing information is used to dynamically control the forwarding of the incoming optical data stream through the optical switch logic to the outgoing optical fiber (column 6, lines 16-20; column 7, lines 5-62).

Kirby does not specifically disclose that the device may be an optical line card, but such cards are well known in the art as a type of hardware implementation for providing various network elements, such as those performing switching and routing functions, together as a unit or package. Kirby already discloses that some of the other system elements may be provided on line cards (such as line cards 275 and 290 in Figure 2B). It would have been obvious to a person of ordinary skill in the art to specifically manufacture the system disclosed by Kirby as an optical

line card in order to conveniently package the optical switching elements together and allow it to be easily installed and used in existing network hardware arrangements.

Regarding claim 36, Kirby discloses that the optical switching logic comprises a demultiplexer 225 operably coupled to demultiplex the incoming optical data stream from a number of incoming optical data streams received from the incoming optical fiber over the incoming optical interface.

Regarding claim 37, Kirby discloses that the optical switching logic further comprises an optical switch 205 operably coupled to receive the incoming optical data stream from the demultiplexer and to selectively pass the incoming optical data stream through to the outgoing optical fiber 265 over the outgoing optical interface or divert the incoming optical data stream for processing by the routing logic. Although the routing logic 200 may receive incoming data directly from a demultiplexer 225 via fibers 232, Kirby also discloses that the switch 205 may itself divert incoming optical data to the routing logic 200 via fibers 250 (column 8, lines 56-57).

Regarding claim 38, Kirby discloses that the optical switch 205 comprises an optical add/drop fabric. Optical switch 205 may convey some signals from the incoming fibers to the outgoing fibers without opto-electrical conversion, but Kirby also discloses that the optical switch 205 is able to drop signals via fibers 250 into the electrical domain to electronic switch/routing logic 200; Kirby further discloses that the optical switch 205 is correspondingly able to add signals from the electrical domain via fibers 245. Therefore, the optical switch 205 comprises an optical add/drop fabric.

Regarding claim 39, again Kirby does not specifically disclose that the optical switch comprises an optical drop-only fabric. However, it would have been obvious to a person of

ordinary skill in the art to specifically have a drop-only fabric in the system described by Kirby simply as an engineering design choice to save costs and reduce complexity if users at that switching location in the system only wished to receive signals from the optical switch and did not require adding/transmitting them from the electrical domain.

Regarding claim 40, Kirby discloses that the optical switching logic further comprises an optical receiver (part of element 275) operably coupled to receive the diverted incoming optical data stream from the optical switch and convert the diverted incoming optical data stream into incoming digitally formatted information for processing by the routing logic (column 7, lines 23-25).

Regarding claim 41, Kirby discloses that routing logic 200 is operably coupled to receive the incoming digitally formatted information from the optical receiver (element 275) and route the incoming digitally formatted information based upon a routing mechanism (column 21-38).

Regarding claim 42, Kirby discloses that the optical switching logic is operably coupled to receive outgoing digitally formatted information from the routing logic over the router interface and output an outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface. Kirby discloses that digitally formatted information may be forwarded through the routing logic 200 to the optical switch logic (specifically at optical switch 205) via fibers 245 (column 8, lines 56-59) for eventual output over and outgoing optical interface. Alternatively, Kirby also discloses that the routing logic 200 is coupled to forward outgoing digitally formatted information to the optical switching logic at multiplexers 260, where the information is output onto fibers 265.

Regarding claim 43, Kirby discloses that the optical switching logic comprises an optical transmitter (part of element 290 in Figure 2B) operably coupled to receive the outgoing digitally formatted information from the routing logic over the router interface and produce the outgoing optical data stream from the digitally formatted information at a predetermined wavelength (column 7, lines 25-29;.column 9,lines 5-7)..

Regarding claim 44, Kirby discloses that elements 290 include optical transmitters which convert electrical signals into optical ones and further discloses that some of those transmitters may comprise tunable lasers so that some of the outputs may produce different optical output wavelengths (column 9, lines 5-7). Kirby does not specifically disclose that the other transmitters may comprise fixed wavelength lasers, but Kirby clearly already discloses that those other transmitters provide fixed, "dedicated" wavelengths, in contrast with the ones comprising tunable lasers (column 7, lines 21-29). It is well known in the art that an optical transmitter providing a dedicated wavelength as disclosed by Kirby may be implemented with a fixed wavelength laser.

It would have been obvious to a person of ordinary skill in the art to use a fixed wavelength laser, as the optical transmitter for providing an outgoing optical data stream at a predetermined wavelength that is already disclosed by Kirby, as an economical way to provide an optical transmission when the capability to transmit more than one wavelength is not required.

Regarding claim 45, Kirby discloses that the optical transmitter may comprise a tunable laser tuned to produce the outgoing optical data stream at the predetermined wavelength (column 9, lines 5-7).

Regarding claim 46, Kirby discloses that wherein the optical switching logic further comprises:

an optical switch 205 operably coupled to receive the outgoing optical data stream from the optical transmitter (Figure 2A shows how a signal can be directed from an output of routing logic 200 to an input of optical switch 205 via fibers 245); and

a multiplexer 260 operably coupled to receive the outgoing optical data stream from the optical switch and add the outgoing data stream to the outgoing optical fiber 265 over the outgoing optical interface.

Regarding claim 47, Kirby discloses that the optical switch 205 comprises an optical add/drop fabric. Optical switch 205 may convey some signals from the incoming fibers to the outgoing fibers without opto-electrical conversion, but Kirby also discloses that the optical switch 205 is able to drop signals via fibers 250 into the electrical domain to electronic switch/routing logic 200; Kirby further discloses that the optical switch 205 is correspondingly able to add signals from the electrical domain via fibers 245. Therefore, the optical switch 205 comprises an optical add/drop fabric.

Regarding claim 48, Kirby discloses that the optical switching logic further comprises a combiner (multiplexers 260) operably coupled to receive the outgoing optical data stream from the optical transmitter 290 (i.e., an optical signal output from routing logic 200) and add the outgoing optical data stream to the outgoing optical fiber 265 over the outgoing optical interface.

Regarding claim 49, Kirby does not specifically disclose that the incoming and outgoing optical interfaces are on an optical physical card in the system discussed above but again, such cards are well known in the art as a way to provide interfaces and elements that are easy to

remove or replace, as Kirby already suggests (Kirby discloses line cards 275, 290, 305, 320, and 325, shown in Figures 2B and 3, for input and outputting signals). It would have been obvious to a person of ordinary skill in the art to include an optical physical card in the system disclosed by Kirby as a known hardware device for providing optical input and output connections, and to further include an interface for the switching device hardware already suggested by Kirby so that it would be able to communicate with the optical physical card.

Regarding claim 50, Kirby discloses a method for communication in an optical communication system (Figures 2A and 2B), the method comprising:

receiving an optical data stream (on input fiber 215)

terminating the optical data stream (by outputting the data onto fiber 250 and receiving it in the electrical domain in electronic switch 200); and

routing the using a predetermined routing mechanism dynamically controlled by routing information in the terminated optical data stream (Kirby discloses that electronic switch p200 processes routing information in the signal; column 6, lines 16-21).

Kirby does not specifically disclose multicast traffic. However, it is common knowledge that in an communication network such as disclosed by Kirby, an input may be routed (i.e., multicast) to multiple outputs as required by users. It would have been obvious to a person of ordinary skill in the art to specifically include multicast traffic in the system disclosed by Kirby simply in order to communicate a signal from one input to multiple destinations if desired.

Regarding claim 51, Kirby discloses that receiving the optical data stream comprises receiving the optical data stream over an incoming optical fiber 215.

Regarding claim 52, Kirby discloses that terminating the optical data stream comprises:

dropping the optical data stream from the incoming optical fiber (by outputting the data stream onto fiber 250); and

converting the data from an optical form into a digital form suitable for routing (using input line card 275 shown in Figure 2B; column 7, lines 21-25).

Response to Arguments

5. Applicants' arguments with respect to claims 1-52 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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